

**Environmental Assessment/Assessment of Effect**

**for**

**Rehabilitation of Volcano Road Drainage  
and Associated Site Improvements**

**Capulin Volcano National Monument  
Union County, New Mexico**

Prepared by:  
U.S. Department of the Interior  
National Park Service  
Capulin Volcano National Monument  
July 2001

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Summary

At Capulin Volcano National Monument, the National Park Service (NPS) proposes to rehabilitate drainage and severe erosion along 2 miles of Volcano Road. The existing drop inlet structures within the paved roadway that are designed to allow water and volcanic sediment to be diverted off of the road are no longer functional because they have plugged with soils and sediments. Storm water and sediment that has been diverted around the plugged inlets at higher elevations has been concentrated into lower elevation inlets. Concentrated water and sediment has resulted in accelerated flows through the outlets that have caused severe scouring and erosion below culvert #24, near the base of the volcano.

This environmental assessment examines two alternatives: no action and the preferred alternative. The preferred alternative would improve drainage and sediment transport on Volcano Road; prevent further side slope damage and improve the visual quality and soil stability below culvert #24; improve visitor use and experience and visitor safety; and reduce the amount of staff time needed for routine and emergency road maintenance.

The preferred alternative would not impact archeological or ethnographic resources; prehistoric or historic structures; cultural landscapes; prime and unique farmlands; air quality; water resources (including wetlands and floodplains); threatened and endangered, candidate species and species of special concern; the socioeconomic environment; or environmental justice. Construction impacts to soils, biotic communities, visitor use and experience, and Monument operations would be adverse, but short-term and minor to moderate in intensity.

Note to Reviewers and Respondents

If you wish to comment on the environmental assessment, you may mail comments to the name and address below. Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address from the record, which we will honor to the extent allowable by law. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** We will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

Please address written comments to:  
Margaret Johnston  
Superintendent, Capulin Volcano National Monument  
P.O. Box 40  
Capulin, NM 88414

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## **Purpose and Need**

### **Overview of Capulin Volcano National Monument**

Capulin Mountain National Monument was established by Presidential Proclamation No. 1340 (39 Stat. 1792) on August 9, 1916 to preserve "a striking example of recent extinct volcanoes... of great scientific and especially geologic interest...". The proclamation was amended September 5, 1962 with Public Law 87-635 "to preserve the scenic and scientific integrity of the Capulin Mountain National Monument... and to provide enjoyment thereof by the public". To more accurately describe the true nature of the monument, the name was changed from Capulin Mountain to Capulin Volcano by Public Law 100-225 on December 31, 1988.

The 793-acre Monument is located in Union County, New Mexico, approximately 30 miles east of the city of Raton and 3 miles north of the town of Capulin. The monument affords an unusual opportunity to drive to the top of a volcano. The unobstructed panoramic view from the top offers visitors excellent opportunities to understand the volcanic formation of the mountain itself, as well as at least 100 recognizable volcanoes surrounding the monument. Volcano Road, the 2-mile paved road that spirals from the base to the top of the volcano, is the subject of the proposed action.

### **Purpose**

The National Park Service (NPS) proposes to rehabilitate drainage and severe erosion along 2 miles of Volcano Road. The existing drop inlet structures within the paved roadway that are designed to allow water and volcanic sediment to be diverted off of the road are often not functional because they can plug with soils and sediments from past storm events. Storm water and sediment that has been diverted around the plugged inlets at higher elevations have been concentrated into lower elevation inlets. Concentrated water and sediment has resulted in accelerated flows through the outlets that have caused severe scouring and erosion in some areas.

### **Need**

The action is needed because the existing drainages are no longer adequate to remove water and sediment from the Volcano Rd. Drainage structures consist of conventional 18-inch pipe culverts with closed curb double drop inlets. The culverts were designed to handle flows of approximately 8 cubic feet per second. These drainage structures have been found to be undersized for annual storm events and some are poorly located. The existing closed curb double drop inlets frequently fail to capture and divert storm water and sediment through the culverts.

Proper drainage is needed to allow the natural dispersed erosional processes to occur without accumulating or concentrating runoff at any single drainage structure. Proper drainage will help prevent accumulation of debris on the road as well as further side slope damage, improve visitor experience and safety, and lessen the amount of staff time spent on clearing the road after storm events. If not addressed, natural erosion and sedimentation processes accelerated through storm events will continue to cause the inlet structures to plug. Plugged drop inlets will continue to cause water to be diverted around the inlets (particularly at higher elevation inlets) and cause sediments to be transported down the road instead of down the inlets and out culverts beneath the road. Accumulated water and sediment will enter inlets at lower elevations and continue to scour slopes, removing soils and vegetation at the culvert outlets below the road.

Undercutting of the slope is occurring under culvert #24. Accelerated flows being discharged from the inlet have been scouring the sideslope to the point where the integrity of the roadway above is

in question. If scouring continues, the roadway would likely need to be closed until the section is reconstructed for safe travel.

The Volcano Road is the only route from the visitor center to the top of the volcano and receives daily traffic from visitors. The monument is 3 miles north of U.S. 87/64, one of the main routes between Texas and southern Colorado. The monument received approximately 62,000 visits in 2,000 with the majority of visitors stopping at the Monument in route to another location. The busiest visitation season occurs in summer, and approximately one-third of Capulin's visitation occurs in the month of July. Most all of Capulin visitors drive the Volcano Road during their visit. Currently, when more intense storm events occur the road must be closed and the monument staff must remove accumulated sediment that was not diverted off of the road. The monument has a small maintenance staff (3 full time employees) and other projects must be stopped in order to address road problems.

### **Background and History**

The 2-mile Volcano Road, accessed off of New Mexico Route 325, spirals from the 7,242-foot base of Capulin Volcano at a 6% grade to the parking lot at the 7,877-foot summit. It is not known when the road was originally constructed, however, some accounts indicate a construction date of 1926 (NPS Engineering study, 1993).

When the original dirt roadway was constructed, the cut slopes above the roadway were not stabilized. Retaining wall construction began in the early 1930's and water was diverted off the road with water bars. During 1963-1964, drop inlets and outlet culverts across the road were installed. The drainage configuration improved the surface drainage of the road but contributed to accelerating the erosion rate below the road. To slow this erosion rate, half-pipe culvert spillways were installed below outlet culverts. In 1977, ten new culverts and drop inlets were installed along the lower elevation sections of the road. The outlet end of the new culverts also included gabion mattress structures for erosion control. New slopes were backfilled and seeded to promote vegetation growth and stabilize the eroded areas.

Through 1985, a majority of the road surface was gravel. In 1986 the road was paved and all of the existing drop inlets were replaced. A severe storm in July 1989 caused washouts, erosions, and major scours, and resulted in cinders and ash materials from the upslopes plugging the grates of the drop inlets. Several storms since that time have continued to add sediment in and on top of the inlets.

### **Public Scoping**

An article describing the proposed action was included in one of the monument's General Management Plan newsletters and distributed to individuals and agencies on the monument mailing list. No responses were received on this project.

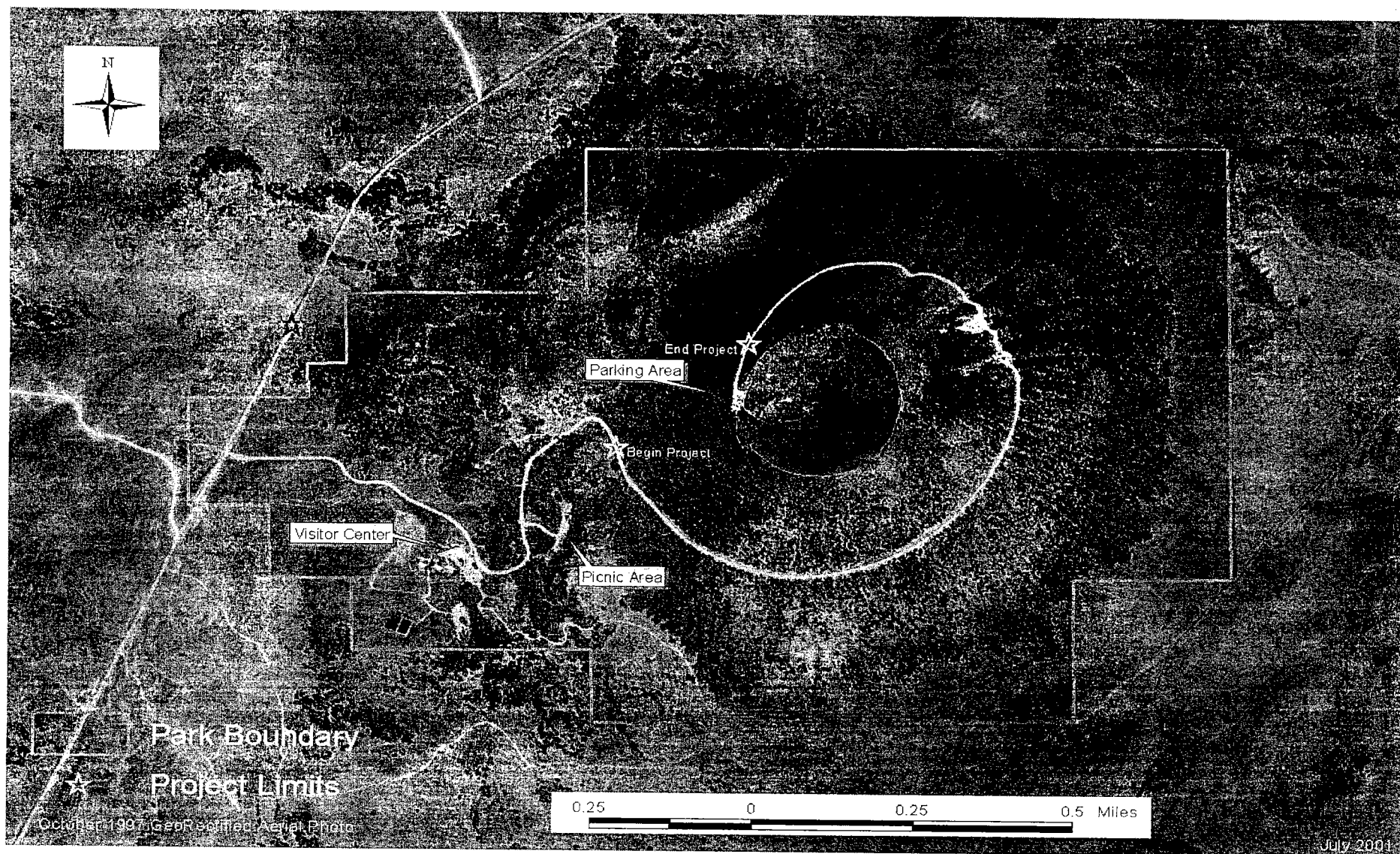


Figure 1: Site Map - Capulin Volcano National Monument



Figure 2. Existing grate inlet

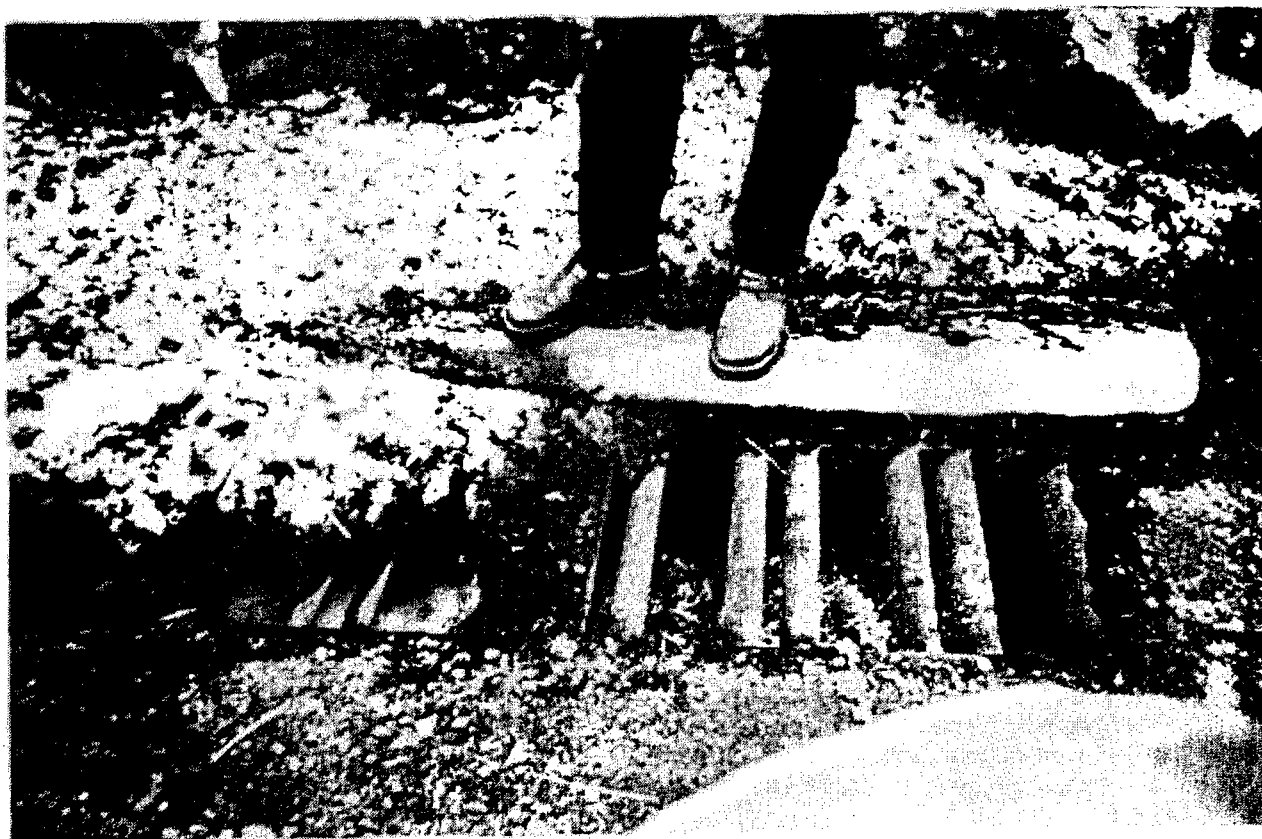


Figure 3. Downslope view of culvert #24



## Relationship of the Proposed Action to Previous and Current Planning Efforts

General Management Plan - The NPS is in the process of preparing a General Management Plan for the Monument. This plan will provide a vision and policy guidance for the preservation of Monument resources, visitor experience and use, the types and general intensities of development, visitor carrying capacities, and partnership opportunities to address management issues internal and external to the Monument. It will also identify connections among the various Monument programs and provide a policy framework for more site-specific planning. This environmental assessment seeks to examine the environmental benefits and consequences of repairing drainage along Volcano Rd. to help preserve and protect monument resources in keeping with the monument mission and proposed General Management Plan.

## Impact Topics

### Impact Topics Analyzed in this Environmental Assessment

#### *Geology and Soils*

Capulin Volcano is one feature of a varied volcanic landscape, the Raton-Clayton volcanic field. More than 100 volcanoes of different type, age, and chemical composition are contained in the Raton-Clayton field. Capulin is one of the most recent eruptions. Absolute age dates for Capulin volcano are between 58,000 and 62,000 years ago. The volcano was formed from the deposition of ash and cinders (fallen pyroclastic material) that fell into place at a natural angle of repose, forming a symmetrical cone. Lateral lava flows also surround the volcano for approximately 15 square miles. The dark vesicular lava and cinders originate from crustal basalt. Present in much of this basalt are numerous foreign fragments of Dakota sandstone, which underlies the volcanic rocks throughout northeast New Mexico.

There are three soil types that comprise the volcano and surrounding lands within the boundaries of the monument (NRCS, 1981). They include the Bandera series; the Fallsam series; and the LaBrier - Rock Outcrop Complex. The Bandera series consists of deep, somewhat excessively drained soils in areas below volcanic cinder cones. These soils are underlain by a continuous layer of gravel-sized cinders at a depth of 12 to 26 inches. Permeability in these soils is moderate and water runoff is slow. The Bandera association is a variation with the series and consists of a gravelly silt loam and gravelly heavy sandy loam to gravel-sized cinders with less than 5 percent soil. Virtually the entire road prism and surrounding slopes are within the Bandera association. Because the proposed action involves ground disturbance activities, geology and soils will be addressed as an impact topic.

#### *Biotic Communities*

Approximately 98% of the monument is covered by pinyon-juniper woodland, gambel oak/shrub mix, and short grass prairie. It appears that rapid forestation of pinon-juniper is occurring on the slopes of Capulin Volcano, because other much older volcanic cones in the field have remained grasslands (Robinson Peak and Jose Butte). In the absence of disturbances such as a major fire, a climax pinon-juniper forest will occur in about 300 years (Wright and Bailey, 1982). Capulin's forests, therefore, are still quite young and have not reached climax.

According to categories described Dick-Peddie (1993), the Monument contains five vegetation types:

1. *Lower Montane Coniferous Forest:* 4% (Ponderosa Pine-Pinyon Pine-Gambel Oak Series).
2. *Pinyon-Juniper Woodland and Mixed Woodland:* 60% (Colorado Pinyon Pine, One-seed Juniper, Skunkbush, Mountain Mahogany, Chokecherry, Currants, Thimbleberry, Blue Grama, and other associations).
3. *Montane Scrub:* 8% (Mountain Mahogany, Skunkbush, Chokecherry, Thimbleberry).

- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impairment may result from National Park Service activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. This environmental assessment will analyze the potential effects of all alternatives presented to determine if the alternative would result in an impairment of park resources. An impairment finding is included in the conclusion section for the following impact topics: Geology and Soils; Biotic Communities; Visitor Use and Experience; and Monument Operations, as well as the conclusion section for each alternative.

#### Impact Topics Dismissed from Further Analysis

##### *Water Resources, Including Wetlands and Floodplains*

National Park Service policies require protection of water quality consistent with the Clean Water Act (1977), a national policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters and to prevent, control, and abate water pollution. Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to prohibit or regulate, through a permitting process; discharge of dredged or fill material into U.S. waters. Groundwater does not occur near the surface at the project area. Runoff associated with existing and proposed drainage structures is discharged into permeable volcanic soils. There are no principal streams, lakes or impoundments of water within the monument boundaries.

Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, where possible, impacts on wetlands. Proposed actions that have the potential to adversely impact wetlands must be addressed in a Statement of Findings. There are no jurisdictional wetlands within or near the project area, therefore, the topic of wetlands has been dismissed from further analysis and a Statement of Findings for wetlands will not be prepared.

Executive Order 11988, Floodplain Management, requires all federal agencies to avoid construction within the 100-year floodplain unless no other practical alternative exists. Certain construction within a 100-year floodplain requires preparation of a Statement of Findings. There are no 100-year floodplains within the project area, therefore, floodplains was dismissed as an impact topic and a Statement of Findings for floodplains will not be prepared.

##### *Archeological Resources, Ethnographic Resources, and Historic Structures*

The National Historic Preservation Act, as amended in 1992 (16 USC 470 et seq.); the National Environmental Policy Act; and the National Park Service's Cultural Resource Management Guideline (1996), Management Policies (2001), and Conservation Planning, Environmental Impact Analysis and Decision Making Handbook (2001), require the consideration of effects on cultural resources, including those listed on or eligible for listing on the National Register of Historic Places.

The undertakings described in this document are subject to Section 106 of the National Historic Preservation Act, under the terms of the 1995 programmatic agreement among the National Park Service, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers. This document will be submitted to the State Historic Preservation Officer (SHPO) for review and comment.

Archeological Resources - There are no known archeological resources within the project area. In addition, steep slopes associated with the road exhibited a low potential for such resources. If any archeological resources are discovered as a result of this rehabilitation project, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and an appropriate mitigation strategy developed in consultation with the New Mexico State Historic Preservation Department.

Historic Structures - Segments of the rock walls, the road, a stone chimney, and Mission 66 structures can be placed within a historic framework for evaluation. Most of the segments of rock walls have been augmented or fortified, most recently in conjunction with the 1986 paving of the road. While these walls cannot be eligible for the National Register in and of themselves, they might be considered contributing elements of a cultural landscape.

Ethnographic Resources - Ethnographic resources are defined by the National Park Service as any "site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it" (Cultural Resource Management Guideline, DO-28:191). The National Park Service, in concert with their general management planning process, has consulted with the following tribes.

- Taos and Picuris Pueblos
- Southern Ute and Ute Mountain Ute
- Wichita and Affiliated tribes
- Cheyenne-Arapaho
- Comanche
- Apache Tribe of Oklahoma
- Mescalero Apache
- Jicarilla Apache

There are no known ethnographic resources in either the project area or its general vicinity. Copies of the environmental assessment will be forwarded to each affiliated tribe for review and comment. If the tribes subsequently identify the presence of ethnographic resources, appropriate mitigation measures would be undertaken in consultation with the tribes. The location of ethnographic sites would not be made public. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001) of 1990 would be followed. Because there are no known ethnographic resources within the project area or its general vicinity, ethnographic resources was dismissed as an impact topic.

#### *Air Quality*

Section 118 of the 1963 Clean Air Act (42 U.S.C. 7401 et. Seq.) requires a National Park Service unit to meet all federal, state, and local air pollution standards. Capulin Volcano National Monument is designated a Class II air quality area under the Clean Air Act, as amended. A Class II designation allows moderate deterioration of air quality within national ambient air quality standards. The Clean Air Act also provides that the federal land manager has an affirmative responsibility to protect air quality related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts.

Should the proposed action be selected, local air quality would be temporarily affected by construction-caused air pollution such as dust and vehicle emissions. Such pollution would be localized and would cease once construction is complete. Any impacts to air quality would be negligible and, as a result, air quality is dismissed as an impact topic.

#### *Socioeconomic Environment*

The proposed action would neither change local and regional land use nor appreciably impact local businesses or other agencies. Implementation of the proposed action could provide a negligible beneficial impact to the economies of Union County and possibly Raton, e.g. an increase in employment opportunities for the construction workforce and a modest increase in revenues for local businesses and government generated from construction activities and workers. Any increase, however, would be temporary, lasting only as long as construction. Therefore, the topic of socioeconomic environment was dismissed from this analysis.

#### *Prime and Unique Farmland*

In August, 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resource Conservation Service as prime or unique. Prime or unique farmland is defined as soil which particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. According to the Natural Resource Conservation Service, there are no prime and/or unique farmlands within the affected area (Ken Sheppy, pers. comm.), therefore prime and unique farmlands has been dismissed as a possible impact topic.

#### *Threatened, Endangered, Candidate Species and Species of Special Concern*

The Endangered Species Act (1973) requires an examination of impacts on all federally-listed threatened or endangered species. National Park service policy also requires examination of the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species.

According to the U.S. Fish and Wildlife Service and the New Mexico Department of Game and Fish, the following threatened, endangered, candidate species and species of special concern are inhabitants or potential inhabitants of Colfax and Union Counties, N.M (The Colfax County species listing is included because the county's eastern boundary is close to the monument):

**Table 1. Federally- and Locally-recognized Species Potentially Found in Colfax and Union Counties**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Status</b>
Southwest Willow Flycatcher	<i>Empidonax tailii extimus</i>	Endangered
Black-Footed Ferret	<i>Mustela nigripes</i>	Endangered
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Arkansas Rver Shiner	<i>Notropis girardi</i>	Threatened
Mountain Plover	<i>Charadrius montanus</i>	Threatened
Mountain Plover	<i>Charadrius montanus</i>	Proposed Threatened
Black-Tailed Prairie Dog	<i>Cynomys ludovicianus</i>	Candidate
Swift Fox	<i>Vulpes velox</i>	Candidate
Lesser Prairie Chicken	<i>Tympanuchus pallidicinctus</i>	Candidate
Townsend's Big-Eared Bat	<i>Corynorhinus townsendii</i>	Species of Concern
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Species of Concern
Artic Peregrine Falcon	<i>Falco peregrinus anatum</i>	Species of Concern
Baird's Sparrow	<i>Ammodramus bairdii</i>	Species of Concern
Ferruginous Hawk	<i>Buteo regalis</i>	Species of Concern
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Species of Concern
Northern Goshawk	<i>Accipiter gentilis</i>	Species of Concern
Western Burrowing Owl	<i>Athene cunicularia hypugaea</i>	Species of Concern
White-Faced Ibis	<i>Plegadis chihi</i>	Species of Concern
Yellow-Billed Cuckoo	<i>Coccyzus americanus</i>	Species of Concern
Flathead Chub	<i>Platygovio (Hybopsis) gracilis</i>	Species of Concern
Plains Minnow	<i>Hybognathus placitus</i>	Species of Concern
Texas Horned Lizard	<i>Phrynosoma cornutum</i>	Species of Concern
Regal Silverspot Lizard	<i>Speyeria idalia</i>	Species of Concern
Dwarf Milkweed	<i>Asclepias uncialis</i> var. <i>uncialis</i>	Species of Concern
Fringed Myotis	<i>Myotis thysanodes</i>	Species of Concern
White-Tailed Ptarmigan	<i>Lagopus leucurus altipetens</i>	State Endangered
Boreal Owl	<i>Aegolius funereus</i>	State Endangered
Southern Redbelly Dace	<i>Phoxinus erythrogaster</i>	State Endangered
Star Gyro Snail	<i>Gyraulus crista</i>	State Threatened

American Marten	<i>Martes americana origenes</i>	State Threatened
Bell's Vireo	<i>Vireo bellii</i>	State Threatened
Baird's Sparrow	<i>Ammodramus bairdii</i>	State Threatened
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	State Threatened
Piping Plover	<i>Charadrius melodus circumcinctus</i>	State Threatened
Suckermouth Minnow	<i>Phenacobius mirabilis</i>	State Threatened
Swamp Fingernailclam	<i>Musculium partumeium</i>	State Threatened
Long Fingernailclam	<i>Musculium transversum</i>	State Threatened
Lake Fingernailclam	<i>Musculium lacustre</i>	State Threatened
Arid Land Ribbon Snake	<i>Thamnophis proximus diabolicus</i>	State Threatened

Parmeter, et al., completed a category listed species inventory in March 1998. Based on the results of the field research, none of the above species of plant, vertebrate, or invertebrate was found to reside on the monument property. Wide-ranging animal species, such as birds of prey, may occasionally pass through the monument's property during migration or foraging activities, however, none are known to nest within the monument.

The topic of threatened, endangered, and candidate species and species of special concern was dismissed as an impact topic because (1) no federally listed threatened or endangered species or species of special concern are known to inhabit the monument; and (2) none of these species have ever been observed in the project area.

#### *Environmental Justice*

According to the guidance issued by the Council on Environmental Quality, environmental justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies. Presidential Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low Income Populations", requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed action would not have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Environmental Justice Guidance (1998). Therefore, environmental justice was dismissed as an impact topic in this document.

#### *Sustainable Design/Development*

NPS 2001 Management Policies (2000) require that facilities be integrated into the park landscape and environs with sustainable designs and systems to minimize environmental impact. Development will not compete with or dominate park features, or interfere with natural processes, such as the seasonal migration of wildlife or hydrologic activity associated with wetlands.

Any facility development, whether it be a new building, a renovation, or an adaptive re-use of an existing facility, should include improvements in energy efficiency and reduction in "greenhouse gas" emissions for both the building envelope and the mechanical systems that support the facility. Maximum energy efficiency should be achieved using solar thermal and photovoltaic applications, appropriate insulation and glazing strategies, energy-efficient lighting and appliances, and renewable energy technologies. Energy-efficient construction projects should be used as an educational opportunity for the visiting public.

Where possible, native materials (soils, vegetation) would be used to rehabilitate the site below culvert #24. Headwalls and other visible concrete structures would consist of colored concrete matched to the color of surrounding soils. Proposed drainage improvements would not interfere with natural hydrologic processes. Therefore, sustainable design/development was dismissed as an impact topic in this document.

#### *Natural Soundscapes*

NPS 2001 Management Policies (2000) direct the NPS to preserve, to the greatest extent possible, the natural soundscapes of parks. The Service will restore degraded soundscapes to the natural condition wherever possible, and will protect natural soundscapes from degradation due to noise (undesirable human-caused sound).

Using appropriate management planning, superintendents will identify what levels of human-caused sound can be accepted within the management purposes of parks. The frequencies, magnitudes, and durations of human-caused sound considered acceptable will vary throughout the park, being generally greater in developed areas and generally lesser in undeveloped areas. In and adjacent to parks, the Service will monitor human activities that generate noise that adversely affects park soundscapes, including noise caused by mechanical or electronic devices. The Service will take action to prevent or minimize all noise that, through frequency, magnitude, or duration, adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified as being acceptable to, or appropriate for, visitor uses at the sites being monitored. Some intermittent noise associated with removal and replacement of drop inlets, and culvert construction, would be heard by visitors during visitor hours. Impacts to visitors would be temporary, lasting only as long as construction. Overall there would be negligible impacts to soundscapes, therefore, natural soundscapes was dismissed as an impact topic in this document.

## ALTERNATIVES

### Alternative A - No Action

The 22 drop-inlet grates along Volcano Rd. that are plugged, broken or non-functional would not be removed replaced. Pipe culvert #24 would not be removed and reconstructed. The trench drain that is proposed between pipe culvert #9 and #10 would not be installed nor would 2 additional inlets and culverts needed at critical locations. The eroded area below culvert #24 would not be backfilled, stabilized and revegetated. Drop inlets would continue to plug and stormwater would continue to be diverted around plugged culverts and concentrated into lower elevation inlets. The area below culvert #24 would continue to erode and vegetation would continue to be lost. Undercutting of the roadway would continue to occur below this culvert and the road could become unstable if undercutting continues to occur. Eventually, the road may need to be closed if road stability threatens visitor safety.

### Alternative B - Preferred Alternative

The preferred alternative would improve drainage on the Volcano Rd. and rehabilitate the badly eroded area below culvert #24. Construction would span a time period of approximately 15 weeks, from early March until the end of June, 2002.

- 23 of 26 of the existing double drop inlets would be replaced with larger double drop inlets
- Bulkhead reducers would be installed between all the new drop inlets and the pipe culverts
- The existing drop inlet #11 would be removed. Culvert #11 would remain in place but would be backfilled and plugged, and a new double drop inlet and culvert pipe would be installed between culverts #11 and #12.
- 1 additional drop inlet and culvert would be installed below culvert #6.
- A trench drain would be installed between culverts #9 and #10.
- A 900 mm x 42 meter pipe culvert would be installed and buried below new drop inlet and culvert #24, and would terminate down the sideslope at a 12 meter gabion. A mattress and class IV loose riprap would be installed at the culvert outlet to provide for scour protection.

The new double drop inlets would be larger than existing drop inlets and would have an open curb, allowing more sediment to be transported through the drainage system. The inlets would improve performance since they would provide more area for inlet flow and are not as susceptible to debris plugging. The bulkhead reducers proposed for each drop inlet are designed to retrofit the inlets (sized to connect to a 24-inch culvert) to the existing 18-inch culverts. If culvert replacement is necessary in the future, 24-inch culverts could be directly connected to the double drop inlets and the bulkhead reducers would be removed. Overall, the larger grates would divert more water and sediment off of the roadway and the culverts on the lower section of the roadway would not be subject to such high flow volumes during storm events.

Replacement of the drop inlets and bulkhead reducers would occur on lands previously disturbed by paving and installation of the existing drop inlets. The double drop inlets would be placed lengthwise and perpendicular with the roadway, as opposed to their current widthwise position, to catch more water and sediment. The pavement would be cut in order to accommodate the larger drop inlets.

Replacement of the drop inlets and bulkhead reducers would occur on lands previously disturbed by paving and installation of the existing drop inlets. The double drop inlets would be placed lengthwise as perpendicular with the roadway as opposed to their current widthwise position to catch more water and sediment. The pavement may be cut in order to accommodate the larger drop inlets. Placement of the trench drain and the 2 additional pipe culverts would require excavation across the roadway to accommodate the drainage structures. A trench would be dug across the entire roadway and the culvert would be installed. To minimize traffic delays after a new culvert is installed, a steel plate would be placed over one lane of the roadway and traffic would be allowed to pass through one lane.



At culvert location #24, the existing 18-inch culvert across the road would be replaced and with a 36-inch culvert to provide sufficient capacity to convey any overflow that is diverted to this inlet. A 140-foot culvert extension would be installed with pipe anchors from the culvert outlet to a stable downslope area. A headwall, stilling basin, and a 20-foot long gabion mattress with a 20-foot long class IV riprap apron would be installed to slow and dissipate water velocity at the final outlet. The culvert extension would then be buried with borrow fill and fortified with a synthetic geogrid reinforcement. The headwall of the culvert would consist of colored concrete to blend in with the color of native rock and soils. The geogrid would be held in place with retaining pins and covered with fill. The fill area would then be revegetated with native materials. To accomplish this work, an access road would be cut above the eroded area beginning at the pavement and extending down into the eroded area. Upon completion of the installation, the access road and remaining disturbed areas would be filled, fortified with geogrid, and revegetated.

#### *Additional Mitigation Measures of the Preferred Alternative*

If during construction previously undiscovered archeological resources are discovered, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and an appropriate mitigation strategy developed in consultation with the New Mexico State Historic Preservation Office.

Storage staging areas would be located outside of monument boundaries, near the monument entrance. Fueling of all construction equipment would be conducted only in equipment staging areas. During the operation of equipment some petrochemicals could seep into the soil. To minimize this possibility, equipment would be checked frequently to identify and repair any leaks.

The summit parking area would be used only to store heavy equipment vehicles overnight. The vehicles would be moved in the morning before the monument opens to visitors and would be parked after the monument closes at night.

The Construction (official) and the contractor would jointly review and agree on a Storm Water Pollution Prevention Plan (SWPPP). The plan would include descriptions and details of erosion controls, including dust control, controls for potential onsite storm water pollutants, description of potential non-storm water discharges at the site, contractor and subcontractor certification forms, and "good housekeeping" practices and requirements. The construction (official) and the contractor would be required to sign a Notice of Intent and Notice of Termination form to begin and end the plan.

A traffic control plan would provide parameters to construction officials to safely guide visitors and monument staff through construction zones. Construction-caused delays to public traffic would last no longer than 30 minutes per passage through the project from 8:00 am to 10:00 am, and no longer than 15 minutes from 10:00 am to 4:00 pm.

A revegetation plan would be agreed upon by the contractor and the NPS prior to bid of the project. Revegetation of the area below drop inlet and culvert #24 would include salvaging all trees and shrubs around and within the construction project area. Seedlings would be removed and kept in water and/or moist soil until they can be replanted onsite after construction. Other vegetation that is not suitable for live transplant would be salvaged onsite. Salvaged vegetation would be cut into pieces and/or cut off at branches. Any larger pieces or branches would be stabilized with wood stakes (18-24"). The rest of the salvaged debris would be used to assist in stabilizing the site as well as providing accumulation zones for debris and seedfall. The placement of the final debris would be supervised by an NPS resource specialist.

A source of weed-free top soil would be approved by the contracting officer in conjunction with the National Park Service natural resource specialist/soil scientist and the Union County Weed Extension Specialist. A contract with the topsoil supplier to minimize the potential for introduction of state listed exotic species may be required.

## Alternatives Considered But Dismissed From Further Analysis

*Install Additional Trench Drains* - Three trench drains would be installed and would replace culverts 9, 11, and possibly 6. If additional trench drains were used, new drop inlets at culverts 1-3 would not be installed and water would be diverted to the larger trench drains installed lower down the road. The purchase and installation of drains at the noted locations would require a majority of the funds available, therefore, this alternative would be considered the first phase of a longer term road reconstruction effort. Damaged and/or non-functioning drop inlets would still need to be replaced at a later date if funding were to become available. At this point, however, the use of trench drains at critical locations would allow the monument to assess the effectiveness of using trench drains to handle water and sediment transport.

After careful consideration, this alternative was dismissed because a majority of the funding available for this project would be used for the trench drains, and runoff and sediment loading in other critical areas of the road would not be addressed.

**Table 2. Comparative Summary of No Action and Preferred Alternatives**

Alternative A – No Action	Alternative B – Preferred Alternative
Existing drainage inlets on Volcano Rd. would not be replaced. The trench drain and additional inlets and culverts needed at critical locations would not be installed. The culvert extension below culvert location #24 would not be installed and the eroded area below culvert #24 would not be filled and restored. Sediment would not be transported off the roadway and would continue to plug drainage inlets. Storm water would continue to be diverted around higher elevation inlets and the accumulated flow would exceed the capacity of the lower elevation inlets. Storm water exiting culvert #24 would continue to erode existing soils and vegetation, and undercutting could threaten the integrity of the section of road above the culvert.	Existing drainage inlets on Volcano Rd. would be replaced. Inlets would be retrofitted with bulkhead reducers so that 24-inch culverts can replace the existing 18-inch culverts in the future. A trench drain and additional inlets and culverts would be installed, including the culvert extension below culvert location #24. The eroded area below culvert #24 would be backfilled, reinforced with geogrid, and revegetated with native vegetation.

Alternative B, the preferred alternative meets the project objectives of

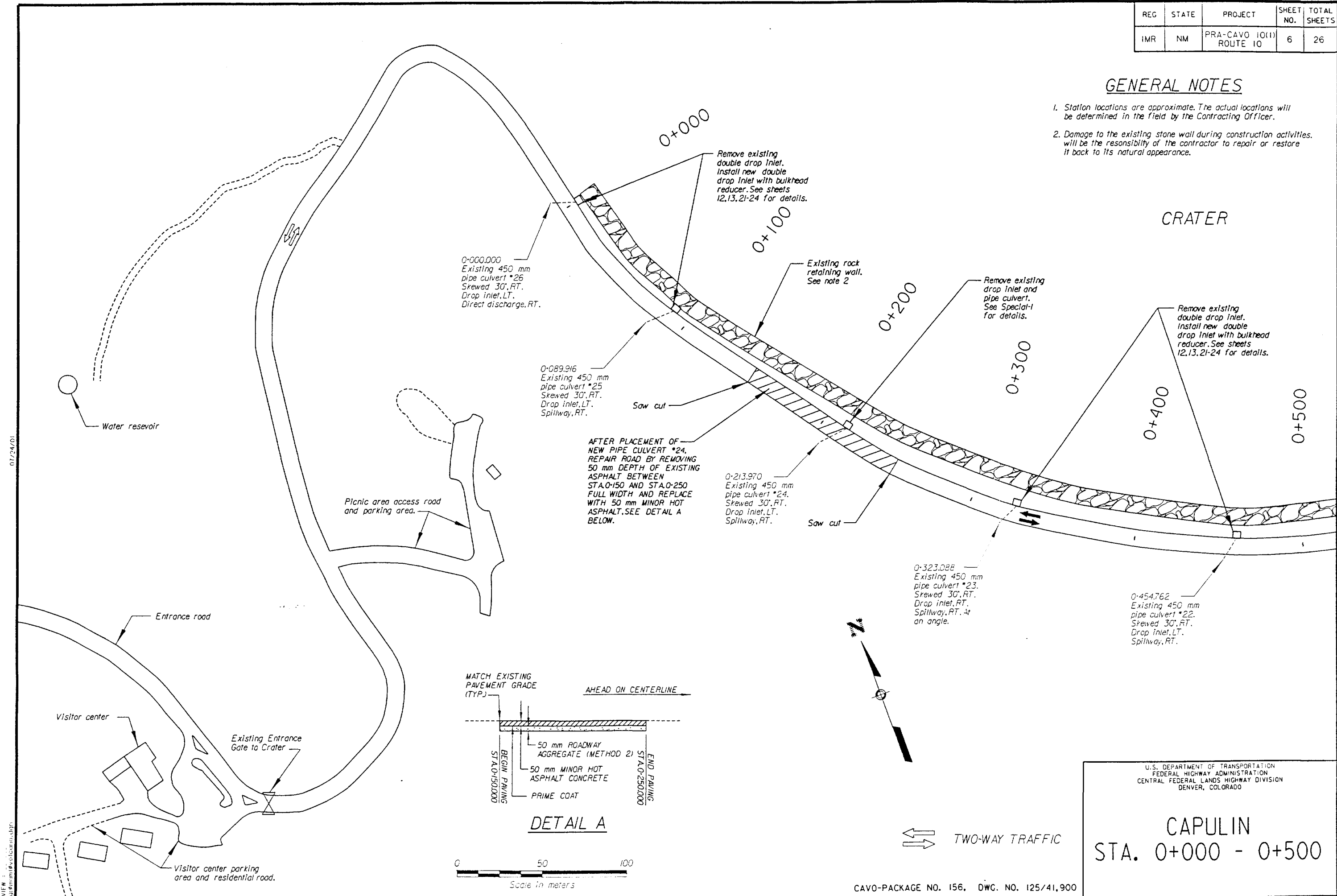
- (1) Improving drainage and removing sediment from the road (replacing smaller drop inlets with wider inlets; installing a trench drain and additional culverts at critical locations);
- (2) preventing further side slope damage below culvert #24 (installing a below ground culvert extension and stabilizing and revegetating the slope);
- (3) improving visitor use and experience and visitor safety (drainage improvements would lessen the occurrence of road closure and correct dangerous undercutting of the road; repairing the slope below culvert #24 would reduce the scarred appearance and improve the visual quality of the volcano); and
- (4) reducing the amount of staff time needed for routine and emergency road maintenance (overall drainage improvements would lessen staff time needed to clear the road of debris).

Alternative A, the No Action Alternative would not meet the project objectives.

REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
IMR	NM	PRA-CAVO 10(1) ROUTE 10	6	26

# GENERAL NOTES

1. Station locations are approximate. The actual locations will be determined in the field by the Contracting Officer.
2. Damage to the existing stone wall during construction activities will be the responsibility of the contractor to repair or restore it back to its natural appearance.



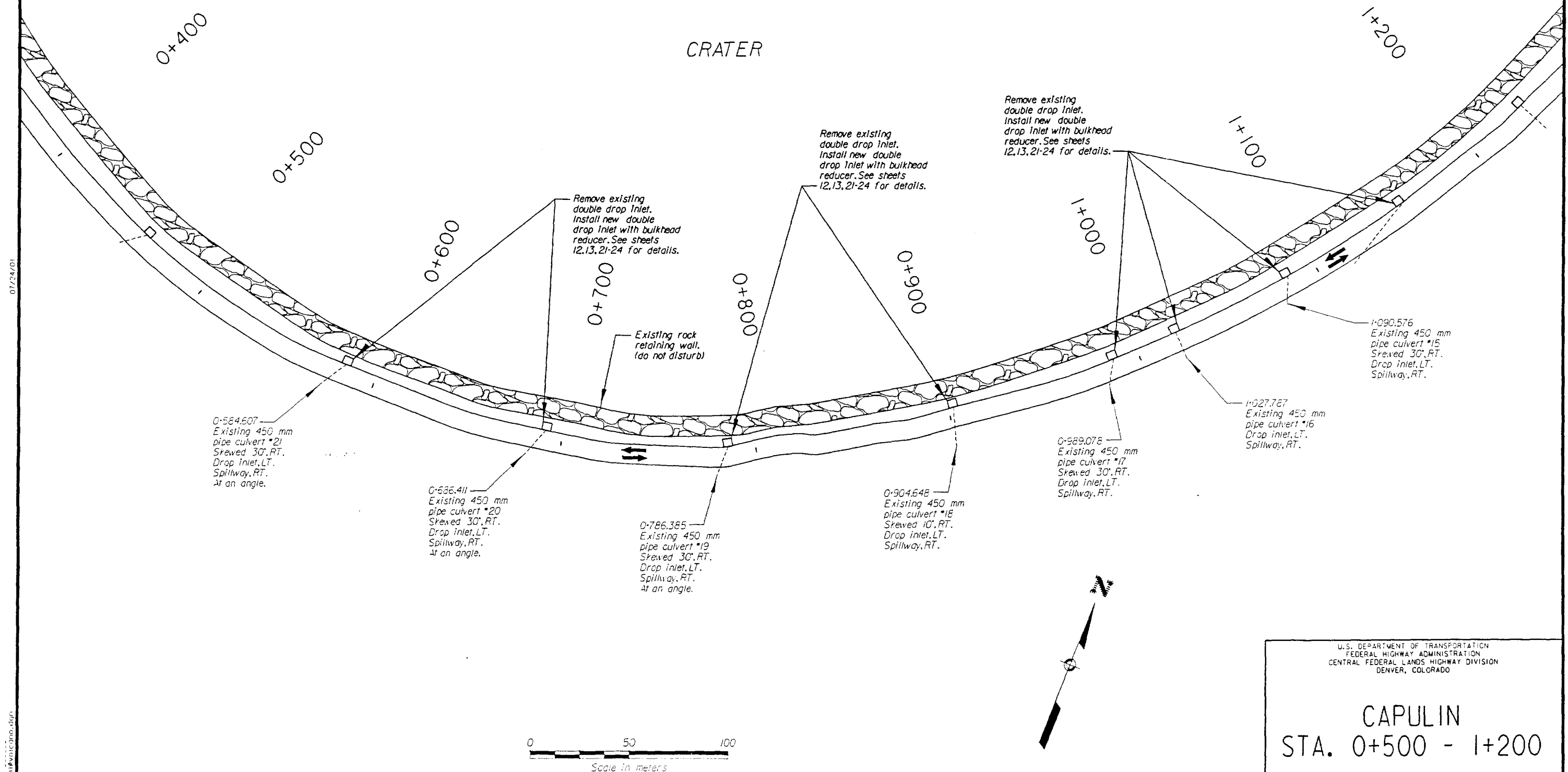
U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION  
CENTRAL FEDERAL LANDS HIGHWAY DIVISION  
DENVER, COLORADO

CAPULIN  
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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
IMR	NM	PRA-CAVO 10(1) ROUTE 10	7	26

## GENERAL NOTES

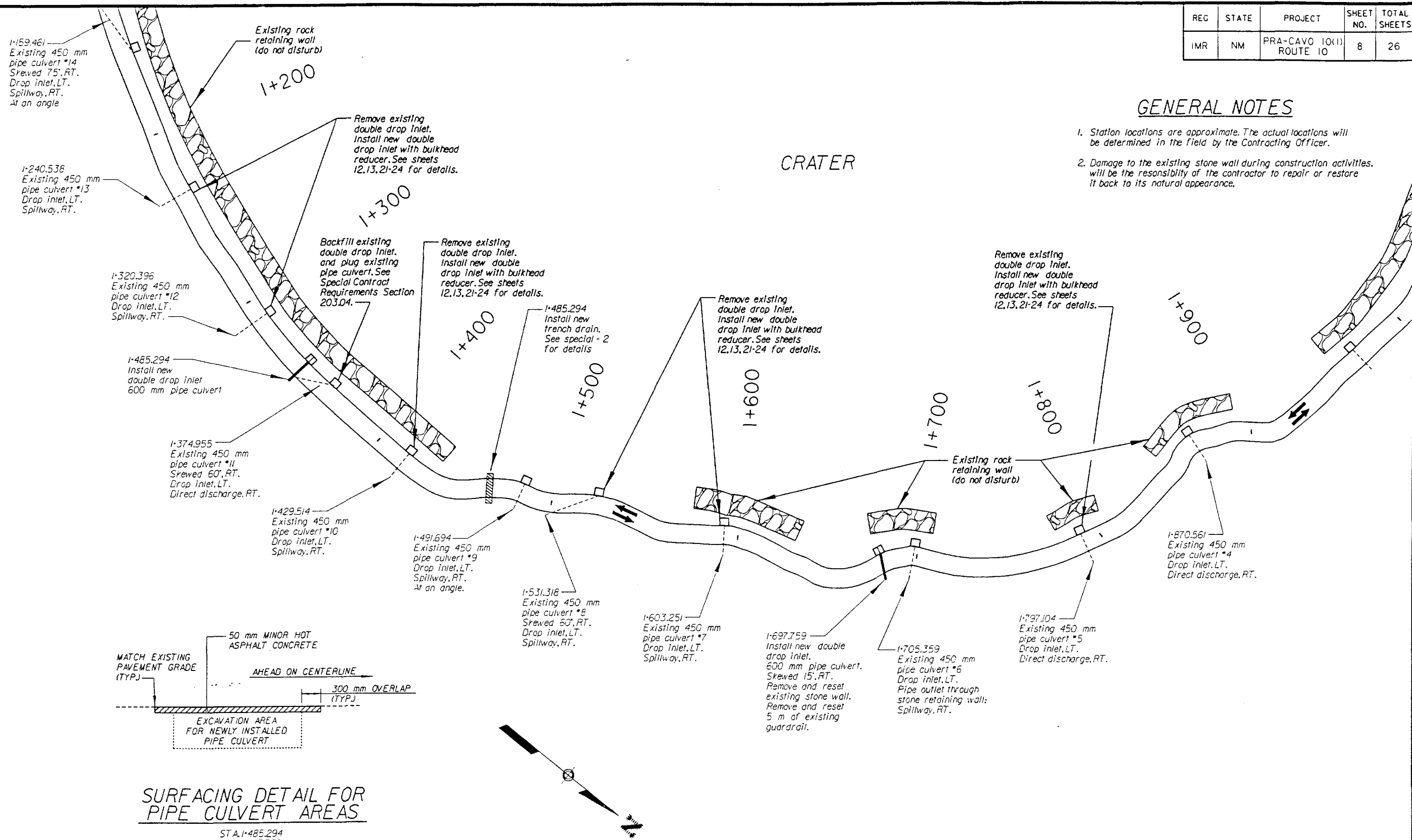
1. Station locations are approximate. The actual locations will be determined in the field by the Contracting Officer.
2. Damage to the existing stone wall during construction activities will be the responsibility of the contractor to repair or restore it back to its natural appearance.



REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
IMR	NM	PRA-CAVO 10(1) ROUTE 10	8	26

# GENERAL NOTES

1. Station locations are approximate. The actual locations will be determined in the field by the Contracting Officer.
2. Damage to the existing stone wall during construction activities will be the responsibility of the contractor to repair or restore it back to its natural appearance.

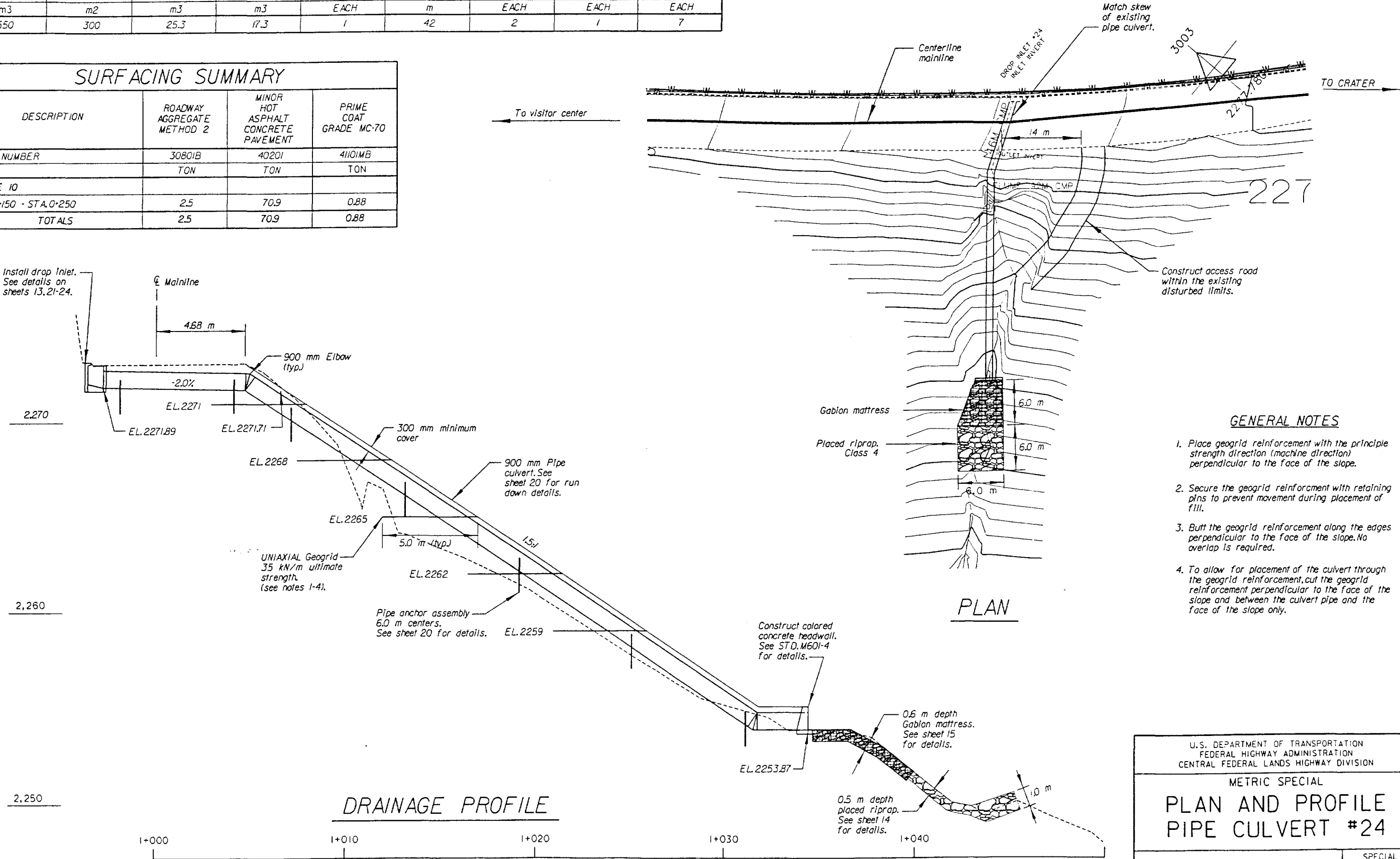




REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
IMR	NM	PRA-CAVO 10(1) ROUTE 10	10	26

SUMMARY OF CULVERT QUANTITIES								
UNCLASSIFIED BORROW	UNIAXIAL GEOGRID 35(kN/m) ULTIMATE STRENGTH	PLACED RIPRAP CLASS 4	GABIONS, GALVANIZED OR ALUMINIZED COATED	CONCRETE, HEADWALL FOR 900 mm PIPE CULVERT	900mm PIPE CULVERT	ELBOW, 900 mm	1.2 m INLET, FRAME, GRATE, AND CURB HOOD-DOUBLE	PIPE ANCHOR ASSEMBLY, 900 mm
20403	20703	25101D	25303	60104AP	60201P	60209P	60427JB	60602P
m3	m2	m3	m3	EACH	m	EACH	EACH	EACH
550	300	25.3	17.3	1	42	2	1	7

SURFACING SUMMARY			
DESCRIPTION	ROADWAY AGGREGATE METHOD 2	MINOR HOT ASPHALT CONCRETE PAVEMENT	PRIME COAT GRADE MC-70
ITEM NUMBER	30801B	40201	41101MB
UNIT	TON	TON	TON
ROUTE 10			
STA.0+150 - STA.0+250	2.5	70.9	0.88
TOTALS	2.5	70.9	0.88



- GENERAL NOTES**
1. Place geogrid reinforcement with the principle strength direction (machine direction) perpendicular to the face of the slope.
  2. Secure the geogrid reinforcement with retaining pins to prevent movement during placement of fill.
  3. Butt the geogrid reinforcement along the edges perpendicular to the face of the slope. No overlap is required.
  4. To allow for placement of the culvert through the geogrid reinforcement, cut the geogrid reinforcement perpendicular to the face of the slope and between the culvert pipe and the face of the slope only.

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CENTRAL FEDERAL LANDS HIGHWAY DIVISION

METRIC SPECIAL  
**PLAN AND PROFILE**  
**PIPE CULVERT #24**

SPECIAL  
SPECIAL-1

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**Table 3. Comparative Summary of Potential Environmental Impacts**

Potential Environmental Impacts		
Impact Topic	No Action Alternative	Preferred Alternative
<b>Geology and Soils</b>	Continued adverse impacts to soils as a result of improperly functioning drainages. Erosion and undercutting would continue occur below culvert #24. Eventually, undercutting of the road below culvert #24 would require the road be closed for repair. If not repaired, impacts to soils would be adverse, long-term, and of moderate intensity.	There would be some temporary disturbance to soils associated with drainage removal, replacement, and reconstruction. Impacts to soils in these areas would be adverse but short-term and minor. There would be some temporary disturbance to soils downslope of culvert #24 during the stabilization process. Impacts would be adverse but short-term and of minor intensity. Stabilization of slopes would result in long-term beneficial impacts to soils of moderate intensity.
<b>Biotic Communities</b>	Vegetation would continue to be lost and wildlife would be displaced in localized areas as a result of storm-scoured slopes. Adverse impacts to vegetation and wildlife would be adverse, long-term, and of minor to moderate intensity.	Approximately .5 acres of sparse grass and understory, and some mature junipers would be removed during construction of the access road needed to install the drainage features and repair the slope. Overall loss of vegetation would be considered adverse but short-term and of minor intensity. Wildlife would be temporarily displaced during construction, but would be expected to return after revegetation. Short-term impacts to wildlife would be adverse but minor. Revegetation following construction would reconstruct the natural spacing, abundance, and diversity of native plant species. Long-term beneficial impacts to vegetation and wildlife of minor intensity would result from stabilization below the culvert.
<b>Visitor Use and Experience</b>	Visitors viewing the volcano from the Lava Flow trail may be able to see scoured slopes below culvert #24. As storm events continue to scour these slopes, the potential to close the Volcano Rd. at culvert #24 and repair undercutting of the road would likely increase. Adverse impacts to visitor use and experience could be long-term and minor to moderate depending on the visitors desire to experience the upper reaches of the volcano.	Visitors would be subject to delays during installation of the trench drain and new culverts. Impacts would be adverse but short term and minor to moderate. Construction would also introduce visual, audible, and atmospheric intrusions into the setting of the roadway and possibly some nearby trails. Although the effects of such intrusions would be adverse, the impacts would be construction related only, short-term, localized, and minor. Any evidence of soil and vegetation disturbance below culvert #24 after construction work is complete would be minor to moderate in comparison to the existing eroded state of the slope. When revegetated areas begin to recover, impacts to visitor experience would be beneficial, long-term, and of minor intensity. Rehabilitation of the drainage along the road would result in a safer, more stable roadway. Impacts would be long-term and of moderate intensity.
<b>Monument Operations</b>	Weekly maintenance would continue to be performed on the roadway to remove cinders that accumulate as a result of blowing wind and occasional rains. Monument maintenance would continue to focus a greater amount of time clearing the roadway after more intense storm events. Impacts would be adverse and could be considered long-term and of moderate intensity if other monument projects suffer as a result of redirected maintenance resources.	Monument operations may experience a shift to accommodate the change in use. Impacts would be negligible to minor and short term. Completion of the project would result in less staff time spent on clearing the road of debris after storm events. Impacts would be beneficial, long term, and of minor intensity.
<b>Cultural Landscapes</b>	There would be no effect to cultural landscapes.	Replacing poorly functioning drop inlets with larger inlets, installing a trench drain, and rehabilitating the slope below culvert #24 would



		have <i>no adverse effect</i> on the cultural landscape. Overall, rehabilitating drainage along the road would have a long-term minor impact to the road itself.
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### Environmentally Preferred Alternative

The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act of 1969 (NEPA), which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101:

1. fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
3. attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
4. preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
5. achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
6. enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The No action alternative would allow the inadequate road drainage system to continue to impact natural resources and potentially threaten the safety of visitors. Overall, this alternative would not fully meet national policies 1-6.

The preferred alternative is the environmentally preferred alternative. Overall, the preferred alternative would result in long-term beneficial impacts to visitor use and experience, monument operations and natural resources and more fully meet national policies 1-6. Replacing the damaged drop inlets and culverts and installing a trench drain to catch diverted water and sediment would allow the natural erosion processes to continue while preventing further deterioration below culvert #24. These actions help to meet policies 3-6 listed above. Implementing the preferred alternative would alleviate current life-safety concerns during and after storm events and more fully meet policies 2,3, and 5 than the no action alternative.

## **Environmental Consequences**

### **Methodology for Assessing Impacts**

Impacts are described in terms of context (are the effects site-specific, local, or even regional?), duration (short-term or long-term?), and intensity (negligible, minor, moderate, or major?). The thresholds of change for the duration and intensity of an impact are defined as follows:

*Short-term:* The impact lasts one year or less.

*Long-term:* The impact lasts more than one year

*Negligible:* the impact is at the lowest levels of detection

*Minor:* the impact is slight, but detectable

*Moderate:* the impact is readily apparent

*Major:* the impact is a severe or adverse impact or of exceptional benefit

### **Cumulative Impacts**

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Quality Act (NEPA), require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7).

Cumulative impacts are determined by combining the impacts of the preferred alternative – Alternative B - with other past, present, and reasonably foreseeable future actions. Therefore it was necessary to identify other ongoing or reasonably foreseeable future actions within Capulin Volcano National Monument and, if applicable, the surrounding region.

Capulin Volcano National Monument is currently in the initial stages of preparing a General Management Plan. The following identifies proposals associated with implementing the monument's General Management Plan or implementing actions approved through other monument planning that are still considered to be reasonably foreseeable actions:

- chip seal of Volcano Road
- removal and relocation of some interpretive trails; construct of some new trails
- minor modifications to some visitor facilities within the existing developed zone
- a shuttle system to transport visitors from the visitor center to the top of the volcano and back
- expansion of primitive camping opportunities within the monument

### **Impacts to Cultural Resources and Section 106 of the National Historic Preservation Act**

In this environmental assessment, impacts to the potentially eligible cultural are described in terms of type, context, duration, and intensity, as described above, which is consistent with the regulations of the Council on Environmental Quality (CEQ) that implement the National Environmental Policy Act (NEPA). These impact analyses are intended, however, to comply with the requirements of both NEPA and Section 106 of the National Historic Preservation Act (NHPA). In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 of the NHPA (36 CFR Part 800, *Protection of Historic Properties*),

impacts to archeological resources and the cultural landscape were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that were either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and (4) considering ways to avoid, minimize or mitigate adverse effects.

Under the Advisory Council's regulations a determination of either *adverse effect* or *no adverse effect* must also be made for affected cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualify it for inclusion in the National Register, e.g. diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the preferred alternative that would occur later in time, be farther removed in distance or be cumulative (36 CFR Part 800.5, *Assessment of Adverse Effects*). A determination of *no adverse effect* means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register.

CEQ regulations and the National Park Service's *Conservation Planning, Environmental Impact Analysis and Decision-making* (DO-12) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g. reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary is included in the impact analysis sections for the cultural landscape under the preferred alternative. The Section 106 Summary is intended to meet the requirements of Section 106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based upon the criterion of effect and criteria of adverse effect found in the Advisory Council's regulations.

### **Regulations and Policy**

As with all units of the National Park System, management of Capulin Volcano National Monument is guided by the 1916 Organic Act; the General Authorities Act of 1970 and the act of March 27, 1978, relating to the management of the National Park System; *NPS Management Policies, 2001*, and other applicable federal laws and regulations. The conditions prescribed by laws, resolutions, and policies most pertinent to the planning and management of the monument are summarized below:

*Desired Condition:* Federal- and State-listed threatened and endangered species and their habitats are sustained.

*Source:* Endangered Species Act; NPS Management Policies

*Desired Condition:* Populations of native plant and animal species function in as natural condition as possible except where special management considerations are warranted.

*Source:* NPS Management Policies

### **Environmental Consequences-Alternative A (No Action)**

The cultural landscape would not be impacted by the no action alternative. Soils, biotic communities, visitor use and experience, and monument operations would continue to be

adversely impacted as a result of the no action alternative. Natural erosion processes accelerated through storm events would continue to cause the existing drop inlets to plug. Some of the sediment would continue to accumulate inside drop inlets and culverts causing them to plug completely. Sediment would also accumulate around drop inlets, or be transported down the road. Eventually the drop inlets would stop functioning properly and NPS staff would be required to remove cinders and other sediment from the roadway more frequently. Impacts to soils would be adverse, long-term, and of moderate intensity.

Vegetation would continue to be removed under culvert #24. Both understory vegetation as well as large trees would be susceptible to removal through accelerated water flows scouring the slope below the culvert. Soils that have been stabilized through root and vegetation growth would also become more susceptible to erosion. Wildlife would continue to be displaced as more soils and vegetation are removed. Impacts would be adverse, long-term, and of minor to moderate intensity.

Visitors viewing the volcano from the Lava Flow trail that goes between the visitor center and picnic area may be able to see scoured slopes below culvert #24. The visitor experience may be adversely affected by the eroded state of the slope. Given the size of the eroded area in relation to the entire viewshed area from the trail, impacts could range from negligible to minor. As storm events continue to scour these slopes, the potential to close the Volcano Rd. at culvert #24 and repair undercutting of the road would likely increase. Adverse impacts to visitor use and experience could be long-term and of minor to moderate intensity depending on the visitors desire to experience the upper reaches of the volcano.

Weekly maintenance would continue to be performed on the roadway to remove cinders that accumulate as a result of blowing wind and occasional rains. Monument maintenance would continue to focus a greater amount of time clearing the roadway of cinders after storm events so that it is safe for visitor use. Impacts would be adverse and could be considered short-term and of minor to moderate intensity if other projects suffer as a result of redirected maintenance resources.

#### *Cumulative Impacts*

Past development within the monument has led to soil disturbance. Development along Volcano Road, visitor facilities, parking facilities, and road and retaining wall construction, particularly near the top of the volcano, have altered the natural erosional processes and thus the locations that sediment is placed on the mountain. Reasonably foreseeable actions may include the removal and relocation of some interpretive trails, and minor modifications to some visitor facilities within the existing developed zone. These actions have the potential to further impact erosional processes. Reasonably foreseeable actions, including the construction of new trails and primitive camping, would have adverse but minimal impacts on geology and soils. The cumulative effect of the no-action alternative on the monument's soils and geology, biotic communities, visitor use and experience, and monument operations, in combination with other past, present, and foreseeably future actions, would be adverse and of minor to moderate intensity.

#### *Conclusion*

The Volcano Road and associated drainage features would continue to malfunction due to the inadequate transport and subsequent accumulation of cinders and soil from major storm events. Continued long term, moderate impacts to soils and vegetation would occur through accelerated flows scouring slopes off of the lower elevation sections of the roadway. Severe erosion and undercutting of the road would continue to occur below culvert #24, resulting in adverse visual impacts as well as potential road closures. Impacts on visitors would be short-term and moderate. NPS staff would continue to devote more time to clearing the road after major storm events, resulting in short-term adverse impacts of moderate intensity to Monument operations. The cumulative effect of the no-action alternative on the monument's soils and geology, biotic communities, visitor use and experience, and monument operations, in combination with other

past, present, and foreseeably future actions, would be adverse and of minor to moderate intensity.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of Capulin Volcano National Monument; (2) key to the natural or cultural integrity of the monument or to opportunities for enjoyment of the monument; or (3) identified as a goal in the strategic plan or other relevant NPS planning documents, there would be no impairment of the monument's resources or values.

### **Environmental Consequences-Alternative B (Proposed Action)**

#### Geology and Soils

Should the preferred alternative be selected, there would be some temporary disturbance to soils associated with removing and replacing drop inlets and installing 2 additional culverts. Impacts to soils in these areas would be short-term and minor. After installation of the culverts, soils would be stabilized with asphalt or concrete after drainage features were installed. There would be some temporary disturbance to approximately 0.5 acre of soils from the roadway and eroded area downslope of culvert #24. The limits of the area would be staked before construction and soil would be removed to cut the access road starting at the ascending lane of Volcano Road (approximately 14 meters up from the proposed culvert location) to midway down the slope where the erosion has occurred. Soils under the existing road would be filled and compacted, and filled and reinforced with an underlying layer of synthetic geogrid. Revegetation/reseeding of the slope after geogrid placement would add to soil stability. Impacts to soils from construction of the access road and rehabilitation of the slope would be adverse, short-term and of moderate intensity. Natural erosional processes of the mountain would continue to result in cinders and soils being deposited in the roadway, however, proposed drainage improvements would help to offset accumulations that can occur as a result of inadequate drainage structures. Long-term beneficial impacts to soils would result from reconstructing the slope and correcting the drainage.

#### Cumulative Impacts

Past development within the monument has led to soil disturbance. The development of Volcano Road, visitor facilities, parking areas, and road and retaining wall construction, particularly near the top of the volcano, have altered the natural erosional processes and thus the locations that sediment is placed on the mountain. Reasonably foreseeable actions may include the removal and relocation of some interpretive trails, and minor modifications to some visitor facilities within the existing developed zone.

Actions proposed in this alternative would not have the potential to further impact erosional processes. The drainage structures would either occur on previously disturbed lands or in critical areas where drainage is currently inadequate. The proposed structures will not prevent natural erosional processes from happening, but adequate drainage and sediment movement would allow the erosional processes to continue occurring and help to mimic natural conditions. The cumulative effect of this alternative, in combination with other past, present, and foreseeably future actions, would be beneficial and of minor intensity.

#### Conclusion

There would be some temporary disturbance to soils from placing 2 culverts and installing a trench drain. Approximately 0.5 acre of soils from the roadway and eroded area downslope of culvert #24 would be disturbed while constructing and using an access road to replace the culvert. Overall, impacts would be short-term, adverse, and of moderate intensity.

The cumulative effect of the preferred alternative on the monument's geology and soils, in combination with other past, present, and reasonably foreseeable future actions, would be beneficial and of minor intensity.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Capulin Volcano National Monument; (2) key to the natural or cultural integrity of the monument or to opportunities for enjoyment of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning document, there would be no impairment of the monument's resources or values.

#### Biotic Communities

Some grasses and small shrubs may be removed during removal and replacement of drainage features. Additional scrub and grass species would be removed through filling eroded areas downslope of culvert #24. Approximately .5 acres of sparsely scattered grass and understory, and less than 5 mature junipers would be removed to construct the access road needed to install the drainage features and repair the slope. In accordance with the revegetation plan, the branches of these trees would be removed and used in the rehabilitation process to stabilize the slope and seedlings would be saved and replanted onsite. Overall, impacts to vegetation would be adverse but short-term and minor.

There may be some displacement of wildlife in areas adjacent to the road during construction. Some displacement may occur through removal of vegetation, particularly in the construction area below culvert #24, however, impacts to wildlife along the road would result mainly through noise associated with construction, and would cease when work is complete. Impacts would be adverse but short-term and minor.

Revegetation following construction would reconstruct the natural spacing, abundance, and diversity of native plant species. Long-term beneficial impacts to vegetation and wildlife of minor intensity would result from stabilization below the culvert.

#### Cumulative Impacts

The development of Volcano Road, visitor facilities, parking areas, and road and retaining wall construction have resulted in removal of native vegetation and the displacement of wildlife. Reasonably foreseeable actions, include the removal and relocation of some interpretive trails and expanding primitive camping opportunities, would further impact biotic communities through removing vegetation and displacing wildlife. Any future development, however, would be located in such a way as to minimize impacts on vegetation and wildlife.

Actions proposed in this alternative would have short-term, minor impacts on biotic communities. The cumulative effect of this alternative, in combination with other past, present, and foreseeably future actions, would be beneficial and of minor intensity.

#### Conclusion

Some vegetation would be lost during construction. Impacts would be adverse, short-term, and of minor intensity. Some wildlife would be displaced, however, impacts to wildlife would result mainly through noise associated with construction, and would cease when work is complete. Impacts would be short-term and minor.

The cumulative effect of this alternative, in combination with other past, present, and foreseeably future actions, would be beneficial and of minor intensity.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Capulin Volcano National Monument; (2) key to the natural or cultural integrity of the monument or to opportunities for enjoyment of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning document, there would be no impairment of the monument's resources or values.

#### Visitor Use and Experience

During removal and replacement of the drop inlets, installation of the culverts and trench drain, and restoration below culvert #24, traffic flow and vehicle access to the top of the volcano may be temporarily restricted. Traffic may be periodically subjected to alternating, one-way flow. There may be some periods when the nature of the construction work may require temporary road closures. All efforts, however, would be made to reduce any delays as much as possible and to alert monument staff as soon as possible if delays longer than normal are expected. Flaggers would be used during work hours to control traffic and visitors would be informed of construction activities and associated delays. Visitors caught in the delays, however, could be frustrated and may consider the delays interminable, and some visitors may choose to avoid ascending the volcano during this period. Some areas of the monument, such as the picnic area, parking lots, or visitor center may experience greater visitor numbers while construction delays are taking place. As a result, impacts to visitor use would be adverse, but minor to moderate in intensity and short-term in duration.

Construction would also introduce visual, audible, and atmospheric intrusions into the setting of the roadway and possibly some nearby trails, which could reduce the quality of the visitor experience during the construction period. Although the effects of such intrusions would be adverse, the impacts would be construction related only, short-term, localized, and minor.

There would be some evidence of soil and vegetation disturbance below culvert #24 during and after construction work is complete. Impacts would be minor to moderate in comparison to the existing eroded state of the slope. The stabilized slope would result in long-term, benefits to visitor safety and would be of moderate intensity. When revegetated areas begin to recover, impacts to visitor experience would be long-term, beneficial, and of minor intensity.

Rehabilitation of the drainage along the road would result in a safer, more stable roadway less prone to periodic closures. Impacts would be long-term and of moderate intensity.

#### *Cumulative Impacts*

Reasonably foreseeable future actions associated with the planning for Capulin Volcano National Monument's general management plan that could affect the way visitors experience the monument. Expanding visitor opportunities, providing a shuttle system, redesigning and adding trails, and additional camping opportunities could result from the plan. Other foreseeable actions that may temporarily impact visitor use and experience include chip sealing Volcano Road. Construction associated with these actions could cause minor congestion along the monument road. Such impacts would temporarily reduce the quality of experience for visitors. The impacts associated with each individual action would generally be short-term and minor, lasting only as long as construction. However, the cumulative intensity of such impacts could be magnified by the number of construction activities that may occur simultaneously. The short-term, minor adverse impacts of the preferred alternative, in conjunction with adverse impacts of other reasonably foreseeable future actions, could result in adverse cumulative impacts to visitor use and experience ranging in intensity from minor to moderate.

The same reasonably foreseeable future actions would result in beneficial impacts to visitor use. Modifying visitor facilities, redesigning existing trails, and expanding camping opportunities, all allow for enhanced interpretive opportunities that could enrich visitor experience. For visitors, beneficial impacts would be minor to moderate, depending on individual needs and expectations. Constructing or redesigning trails and providing shuttle service to the volcano would also have minor to moderate, beneficial impacts upon visitors by reducing crowding or allowing for more visitor enjoyment of the monument. Chip sealing the road would provide for a smooth, safe roadway and improve visitor experience and safety. The minor to moderate beneficial impacts of the preferred alternative, in conjunction with the beneficial impacts of other reasonably

foreseeable future actions, could result in net beneficial cumulative impacts to visitor use ranging in intensity from minor to moderate.

#### *Conclusion*

There would be minor to moderate, long-term beneficial impacts to use and experience. Construction associated impacts to visitor use and experience would be adverse but short-term and minor.

The cumulative effect of the preferred alternative on the monument's visitor use and experience, in combination with other past, present, and reasonably foreseeable future actions, would be beneficial and of minor to moderate intensity.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Capulin Volcano National monument; (2) key to the natural or cultural integrity of the monument or to opportunities for enjoyment of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning document, there would be no impairment of the monument's resources or values.

#### Monument Operations

If the preferred alternative were implemented, construction may temporarily affect monument operations. The Monument staff may not be able to access areas along the Volcano Rd. as easily during construction. Visitors may use the monument differently during construction, opting to remain in the visitor center or use other areas of the monument to avoid construction and traffic congestion on the road. Monument staff and operations may experience a shift to accommodate the change in use. Impacts would be negligible to minor and short term.

Completion of the project would result in less staff time spent on clearing the road of debris after storm events. Impacts would be beneficial, long term, and of minor intensity.

#### *Cumulative Impacts*

Past development in the monument, including parking lots, the retaining wall, visitor facilities, and construction of Volcano Road, have altered the natural erosional processes of the mountain to the extent that routine maintenance is a necessity. Reasonably foreseeable future actions associated with Capulin Volcano National Monument's general management plan, including modifying visitor facilities, adding a shuttle system, and constructing additional trails and camping opportunities could result from the plan. Other foreseeable actions that may temporarily impact monument operations include chip sealing Volcano Road. All of these impacts have the potential to cause slight shifts in monument operations. The impacts associated with each individual action would generally short-term and negligible, lasting only as long as construction. However, the cumulative intensity of such impacts could be magnified by the number of activities that may occur simultaneously.

The same reasonably foreseeable future actions would result in beneficial impacts to monument operations. Chip sealing the road and adding a shuttle system would likely result in a decrease in traffic congestion and routine road maintenance. The long-term, beneficial impacts of the preferred alternative, in conjunction with long-term beneficial impacts of other reasonably foreseeable future actions, could result in beneficial cumulative impacts to monument operations of minor intensity.

#### *Conclusion*

Monument staff and operations may experience a shift in operations to accommodate the change in use. Impacts would be negligible to minor and short term. Completion of the project would



result in less staff time spent on clearing the road of debris after storm events. Impacts would be beneficial, long term, and of minor intensity.

The long-term, beneficial impacts of the preferred alternative, in conjunction with long-term beneficial impacts of other reasonably foreseeable future actions, could result in beneficial cumulative impacts to monument operations of minor intensity.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Capulin Volcano National Monument; (2) key to the natural or cultural integrity of the monument or to opportunities for enjoyment of the monument; or (3) identified as a goal in the monument's general management plan or other relevant National Park Service planning document, there would be no impairment of the monument's resources or values.

#### Cultural Landscapes

The rock walls and other associated structures that are considered potential elements of a cultural landscape would not be effected. Installing larger inlets and an additional culvert, installing a trench drain, and rehabilitating the slope below culvert #24 would have an effect on the cultural landscape. The eroded section below culvert #24 would be rehabilitated and restored to more of a semblance of its historic appearance, resulting in a long-term, minor beneficial impact to the landscape. Overall, rehabilitating drainage along the road and below culvert #24 would have a long-term minor adverse impact to the road itself.

#### *Cumulative Impacts*

Various alterations to some of the landscape elements of the monument have occurred over the years, including changes to the rock walls, summit restrooms, visitor center, and paving of the Volcano Road. Because the impacts associated with implementation of the preferred alternative would be such a small component of any overall cumulative impact, the long-term, minor, adverse impacts of the preferred alternative, in conjunction with past adverse impacts, would result in negligible, adverse cumulative impacts to the cultural landscape.

#### *Section 106 Summary*

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service determines that implementation of the preferred alternative would have *no adverse effect* on the road, which is considered a contributing element to the cultural landscape that has the potential to be eligible to be listed in the National Register of Historic Places.

#### *Conclusion*

The preferred alternative would have a long-term, minor, adverse impact upon the cultural landscape. Under Section 106 of the National Historic Preservation Act, implementation of the preferred alternative would have *no adverse effect* on the Historic Landscape.

Overall, the long-term, minor, adverse impacts of the preferred alternative, in conjunction with past adverse impacts, would result in negligible, adverse cumulative impacts to the cultural landscape.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Petrified Forest National Park; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

## **Consultation and Coordination**

### **Agencies and Organizations**

#### **Federal Agencies**

- U.S. Fish and Wildlife Service
- Natural Resource Conservation Service

#### **State Agencies**

- New Mexico Department of Game and Fish
- Historic Preservation Division, Office of Cultural Affairs

#### **Native American Groups**

- Taos and Picuris Pueblos
- Southern Ute and Ute Mountain Ute
- Wichita and Affiliated tribes
- Cheyenne-Arapaho
- Comanche
- Apache Tribe of Oklahoma
- Mescalero Apache
- Jicarilla Apache

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